Observations of Comet i 1898 (Brooks), made at the Royal Observatory, Greenwich.

(*Communicated by the Astronomer Royal.*)

The following observations were made with the Great Equatorial (G. E.), aperture 28 inches, and the Sheepshanks Equatorial (S. E.), aperture 6·7 inches, by taking transits over two cross-wires at right angles to each other, and each inclined 45° to the parallel of declination. Magnifying power of G. E. 485, and S. E. 55.

1898.	Greenwich Mean Solar Time. d h m s	Observer.	Instrument.	☄ − ✱ R.A. m s	Corr. for Refraction. s	Log. Factor of Parallax.	☄ − ✱ N.P.D. ′ ″	Corr. for Refraction. ″	Log. Factor of Parallax.	No. of Comps.	Apparent R.A. of ☄ h m s	Apparent N.P.D. of ☄ ° ′ ″	Comp. Star.
Oct.	31 6 41 48	L.	G. E.	+0 10·96	0·00	9·5839	−0 15·4	0·0	0·6689	3	...	...	*a*
	31 6 41 48	”	”	−0 12·31	0·00	9·5839	+0 7·8	0·0	0·6689	3	...	...	*b*
	31 6 47 15	”	”	−0 8·19	0·00	9·5892	−2 26·1	0·0	0·6747	5	17 7 42·88	59 14 43·4	*c*
	31 5 59 30	A. C.	S. E.	+1 48·81	0·00	9·5346	−0 24·2	0·0	0·6248	6	17 7 28·68	59 9 27·5	*d*
	31 7 50 11	C. D.	”	−0 39·89	0·00	9·6256	−4 10·0	−0·1	0·7383	3	17 8 0·67	59 21 45·6	*e*
	31 7 55 42	”	”	+0 10·78	−0·01	9·6271	+5 11·6	+0·2	0·7433	3	17 8 1·84	59 22 21·3	*c*
Nov.	1 6 49 37	G. B.	”	−1 20·45	0·00	9·5777	+0 26·6	0·0	0·6968	6	17 14 2·97	61 52 30·2	*f*
	3 6 46 2	A. C.	”	+0 1·67	0·00	9·5537	+4 25·7	+0·1	0·7285	1	17 24 54·92	66 45 36·8	*g*
	3 6 46 2	”	”	−1 59·12	0·00	9·5537	−2 3·0	0·0	0·7285	1	17 24 55·41	66 45 42·1	*h*
	3 7 6 52	H. F.	”	+0 5·49	−0·01	9·5713	+6 34·0	+0·1	0·7434	5	17 24 58·73	66 47 45·1	*g*
	3 7 6 52	”	”	−1 55·50	0·00	9·5713	−0 0·3	0·0	0·7434	5	17 24 59·03	66 47 44·8	*h*
	4 7 4 21	A. C.	”	−2 3·65	−0·01	9·5621	+7 23·2	+0·2	0·7550	1	17 29 36·28	69 3 38·0	*i*
	4 6 6 40	H. F.	”	−2 13·74	0·00	9·4963	+2 1·9	+0·1	0·7204	2	17 29 26·20	68 58 16·6	*i*
	4 6 40 43	G. B.	”	−2 9·32	−0·01	9·5414	+4 50·5	+0·1	0·7406	3	17 29 30·61	69 1 5·2	*i*
	6 5 40 58	H. F.	”	−0 36·84	0·00	9·4481	+2 37·1	+0·1	0·7402	6	17 37 25·82	73 7 11·0	*k*
	8 5 47 50	A. C.	”	+3 17·22	0·00	9·4541	−3 14·2	−0·1	0·7700	6	17 44 9·28	76 53 0·5	*l*
	10 5 36 20	”	”	+0 36·34	0·00	9·4333	+2 4·5	+0·1	0·7886	6	17 49 43·01	80 13 36·5	*m*

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Notes.

The observations are corrected for refraction, but not for parallax. They are also corrected for the error of inclination of the wires and for the motion of the Comet.

The initials L., A. C., C. D., H. F., and G. B. are those of Mr. Lewis, Mr. Crommelin, Mr. Davidson, Mr. Furner, and Mr. Bischlager respectively.

The following micrometric measures of the position angle and distance of the Comet from star *c* were made by L. with the Great Equatorial.

Greenwich Mean Solar Time.	Observed Position Angle.	Greenwich Mean Solar Time.	Observed Distance.
d h m s	° ′	d h m s	″
1898 Oct. 31 7 14 9	200 0	31 7 15 39	46·08
31 7 20 58	170 45	31 7 22 9	86·69

Assuming that the motion of the Comet in 48 minutes was $+13^{s}{\cdot}36$ in R.A. and $+321''{\cdot}1$ in N.P.D., it was found that these measures were best represented by the following position of the Comet relatively to the star at the mean of the four times.

Greenwich Mean Solar Time.	☄ – ✱ R.A.	Log. Factor of Parallax.	☄ – ✱ N.P.D.	Log. Factor of Parallax.	Apparent R.A. of ☄.	Apparent N.P.D. of ☄.
d h m s	m s		′ ″		h m s	° ′ ″
Oct. 31 7 18 14	+0 0·22	9·6114	+1 0·8	0·7060	17 7 51·29	59 18 10·3

The following are the corresponding computed position angles and distances at the four times.

Greenwich Mean Solar Time.	Corresponding Position Angle.	Greenwich Mean Solar Time.	Corresponding Distance.
d h m s	° ′	d h m s	″
Oct. 31 7 14 9	199 27	31 7 15 39	44·05
31 7 20 58	170 59	31 7 22 9	88·72

Comparison Stars.

	Star's Name.	Assumed R.A. 1898·0.	Assumed N.P.D. 1898·0.	Authority.
		h m s	° ′ ″	
a	Anonymous	17 7 28	59 15	
b	Anonymous	17 7 52	59 14	
c	Lalande 31323	17 7 49·65	59 17 13·6	Equatorial Comparisons with Stars *d* and *e*, 1898 Nov. 8.
d	Lalande 31281	17 5 38·46	59 9 55·5	Paris, 21735; Leiden Astr. Gesell. Zones, 193,202.
e	B. D. + 30°, No. 2945	17 8 39·13	59 25 59·9	Bonn Observations, vol. vi., Leiden Astr. Gesell. Zones, 55.
f	W. B. (2) XVII. 376	17 15 21·88	61 52 8·2	Paris, 21958; Cambridge Astr. Gesell. Catalogue, 8136.
g	W. B. (2) XVII. 674–5	17 24 51·50	66 41 15·8	Berlin Astr. Gesell. Catalogue, 5993.
h	W. B. (2) XVII. 738	17 26 52·76	66 47 50·1	Paris, 22306; Berlin Astr. Gesell. Catalogue, 6010; with PM $+{}^{s}{\cdot}004+{}''{\cdot}07$.
i	Piazzi XVII. 163	17 31 38·09	68 56 19·7	Paris, 22413; Brussels, 7074; Greenwich Ten-year Catalogue (1880), 2769; Berlin Astr. Gesell. Catalogue, 6038; with PM $+{}^{s}{\cdot}003+{}''{\cdot}02$.
k	W. B. (2) XVII. 1177–8–9	17 38 0·65	73 4 38·7	Paris, 22605; Berlin Astr. Gesell. Catalogue, 6404.
l	B. D. + 13°, No. 3447	17 40 49·93	76 56 19·1	Rumker 17^{h} Nachtrag, Bonn Observations, vol. vi., Sj 6375.
m	W. B. XVII. 953	17 49 4·42	80 11 36·3	First Glasgow Catalogue, 4420; Paris Catalogue, 22965.

Notes.

The place of star *c* in Lalande's Catalogue is 30^{s} too small in R.A. and 31″ too small in N.P.D.

Rumker's R.A. of star *l* has been diminished by 1 sec. The R.A. of star *m* in Lalande's Catalogue is 1^{m} too great.

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The comet was also photographed on November 1 and November 3 with the 30-inch reflector of the Thompson Equatorial. The photographs were taken in the primary focus of the reflector, which has a focal length of 11 feet 3 inches, and an aperture of 30 inches. Two plates were exposed on each night, and three exposures made on each. On the first plate on November 1 the exposures were 300^{s}, 130^{s}, and 60^{s}; and on the second, 240^{s}, 180^{s}, and 125^{s}. On November 3 the exposures were 240^{s}, 207^{s}, and 120^{s} for the first plate, and 150^{s}, 120^{s}, and 95^{s} for the second. The image of the comet is approximately at the centre of the plate on the photographs taken on November 3, but on those taken on November 1 the comet is at a considerable distance from the centre, the approximate co-ordinates of the images (expressed in *réseau* intervals of $5^{mm}=5'$) being $x=18{\cdot}1$ $y=6{\cdot}5$ on the first plate, and $x=17{\cdot}9$ $y=12{\cdot}9$ on the second, the co-ordinates of the centre of the plates being $x=14{\cdot}0$ $y=14{\cdot}0$.

The positions of the two darker images of the comet on November 1 and of the three images on November 3, together with those of about six reference stars, referred to the lines of the *réseau*, were measured by different measurers in the micrometer in the same manner as the plates for the Astrographic Catalogue. Two measures were made of each image of the comet, and one of each image of the reference stars, and the means taken.

The right ascensions and declinations of the reference stars were taken from the *Astronomischen Gesellschaft Catalogues*, Cambridge and Berlin respectively. Standard co-ordinates were computed from these, which were compared with the measures and linear corrections of the form $ax+by+c$ and $dx+ey+f$ deduced as in the reduction of the measures for the Astrographic Catalogue. The values of the constants for the several plates are as follows:—

		a	*b*	int. *c*	*d*	*e*	int. *f*
Nov.	1 (1)	−·01197	−·01315	−·0819	+·01404	−·01291	−·2356
	1 (2)	−·01232	−·00760	+·2336	+·00924	−·01196	+·4835
	3 (1)	−·01320	−·01321	+·3888	+·01472	−·01281	+·1460
	3 (2)	−·01333	−·01867	+·7904	+·02040	−·01304	+·3608

The values of *c* and *f* are arbitrary, and depend on the R.A. and Dec. of the centre of the plates assumed in the computation of the "Standard Co-ordinates" of the stars. The unit in which *a* and *f* are expressed is the *réseau* interval, *i.e.* 5′.

It should be noted that the photographs on November 3 were slightly out of focus, which may account to some extent for the change in the scale values *a* and *e*.

With the values of the constants given above, corrections of the form $ax+by+c$, $dx+ey+f$, have been applied to the measured co-ordinates of the stars and comet. The following table exhibits the residual differences of the measured and calculated positions of the different stars on the four plates:—

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Places of Reference Stars used in deducing the Comet's place.

November 1.

Name.	Mag.	Assumed R.A. 1875·0.	Apparent Corr. to assumed R.A. Plate I.	Plate II.	Assumed Dec. 1875·0.	Apparent Corr. to Assumed Dec. Plate I.	Plate II.
		h m s	s	s	° ′ ″	″	″
B.D. + 28·2709	9·1	17 12 4·76	+0·09	+0·11	+28 3 18·5	−0·6	−0·2
27·2786	9·0	17 13 10·10	−0·08	−0·10	27 50 31·3	+0·6	+0·6
28·2718	8·2	13 40·09	+0·01	−0·01	28 23 0·4	+0·2	−0·3
28·2720	8·8	13 56·57	−0·10	−0·13	28 32 30·3	−0·5	−0·2
27·2790	7·1	14 24·81	...	+0·01	27 24 52·0	...	+0·5
28·2722	7·1	14 27·38	+0·09	+0·14	28 9 21·8	+0·4	+0·2
27·2792	8·7	15 39·61	0·00	+0·01	27 39 22·2	0·0	−0·9

November 3.

Name.	Mag.	Assumed R.A. 1875·0.	Apparent Corr. to assumed R.A. Plate I.	Plate II.	Assumed Dec. 1875·0.	Apparent Corr. to Assumed Dec. Plate I.	Plate II.
+22·3147	8·9	17 22 38·16	+0·06	+0·06	+22 53 30·1	−0·9	−0·5
23·3122	9·0	23 8·60	+0·03	+0·02	23 42 26·3	+0·2	+0·2
23·3123	8·6	23 53·93	+0·07	+0·07	23 19 55·6	−0·3	−0·8
22·3156	8·5	24 27·96	−0·07	−0·05	22 24 22·5	+0·9	+0·4
22·3158	7·7	25 12·56	+0·02	0·00	22 58 14·0	0·0	−0·2
23·3124	8·1	25 55·10	−0·07	−0·05	23 13 18·4	+0·3	+0·4

To the right ascensions and declinations of the comet determined directly from the photographs, corrections to reduce a star in the position of the comet from Mean Place 1875·0 to Apparent Place on the date of observation, were applied, as in the computation of "Standard Co-ordinates," the Mean Places of the stars for 1875·0 were used.

The following are the Apparent Places of the comet corresponding to the mean of the times of the exposures as deduced from the four photographs:—

Date.	G.M.T.	Apparent R.A.	Apparent Dec.	Log. Δ.	Corr. for Parallax. R.A.	Dec.
	h m s	h m s	° ′ ″		s	s
Nov. 1 (1)	7 55 2	17 14 21·22	+28 0 45·5	9·8479	+0·59	+8·1
1 (2)	8 42 8	14 32·97	27 55 39·6	9·8479	+0·59	+8·8
3 (1)	7 33 50	25 5·22	23 9 46·0	9·8720	+0·52	+7·8
3 (2)	7 46 23	25 7·78	23 8 32·2	9·8720	+0·53	+7·9

In order to examine the relative accuracy of the different instruments and methods of observation of the comet, the individual comparisons on October 31 have all been reduced to the same epoch, viz.—6^{h} 30^{m} G.M.T., the assumed motion of the comet in 48 minutes being $+13^{s}·36$ in R.A. and $+321''·1$ in N.P.D. This motion has been derived from Ristenpart and Möller's Ephemeris (supplement to *Ast. Nach.* 3526), corrected by the observations on October 31 and November 1. The correction for parallax has been applied here, the assumed value of log. Δ being 9·8364, this value being derived from Ristenpart and Möller's Ephemeris.

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1898.	Greenwich Mean Solar Time.	Observer.	Instrument.	Method of Observation.	☄−✳R.A. Corrected for Refraction and Parallax.	☄−✳N.P.D. Corrected for Refraction and Parallax.	Correction for Motion in R.A.	Correction for Motion in N.P.D.	Apparent R.A. of ☄ Reduced to 6h 30m.	Apparent N.P.D. of ☄ Reduced to 6h 30m.	Comp. Star.
d	h m s				m s	′ ″	s	′ ″	h m s	° ′ ″	
Oct. 31	5 49 31	A. C.	S. E.	Cross-bar Micrometer	+1 45·79	−1 43·2	+11·27	+4 30·8	17 7 36·93	59 12 39·3	d
	5 54 31	,,	,,	,,	+1 48·49	−1 6·3	+ 9·88	+3 57·4	38·24	42·8	,,
	5 57 26	,,	,,	,,	+1 48·99	−0 50·3	+ 9·06	+3 37·8	37·92	39·2	,,
	6 0 18	,,	,,	,,	+1 48·79	−0 12·5	+ 8·27	+3 18·7	36·93	57·9	,,
	6 6 20	,,	,,	,,	+1 51·85	+0 17·2	+ 6·59	+2 38·3	38·31	47·2	,,
	6 8 52	,,	,,	,,	+1 51·94	+0 33·1	+ 5·88	+2 21·4	37·69	46·2	,,
31	6 37 24	L.	G. E.	,,	+0 10·34	−0 51·9	− 2·06	−0 49·5	...	...	a
	6 43 33	,,	,,	,,	+0 12·16	−0 3·9	− 3·77	−1 30·6	...	...	,,
	6 44 28	,,	,,	,,	+0 12·03	−0 10·8	− 4·03	−1 36·8	...	...	,,
	6 37 24	,,	,,	,,	−0 12·76	−0 26·1	− 2·06	−0 49·5	...	...	b
	6 43 33	,,	,,	,,	−0 11·54	+0 16·7	− 3·77	−1 30·6	...	...	,,
	6 44 28	,,	,,	,,	−0 10·97	+0 12·4	− 4·03	−1 36·8	...	...	,,
	6 45 54	,,	,,	,,	−0 7·99	−2 47·8	− 4·43	−1 46·4	38·65	35·3	c
	6 46 36	,,	,,	,,	−0 7·95	−2 34·2	− 4·62	−1 51·0	38·50	44·3	,,
	6 47 21	,,	,,	,,	−0 7·37	−2 30·9	− 4·83	−1 56·1	38·87	42·5	,,
	6 47 57	,,	,,	,,	−0 7·42	−2 27·6	− 5·00	−2 0·1	38·65	41·8	,,
	6 48 28	,,	,,	,,	−0 7·38	−2 24·6	− 5·14	−2 3·5	38·55	41·4	,,
31	7 48 39	C. D.	S. E.	,,	−0 39·37	−4 25·3	−21·89	−8 46·1	39·30	44·3	e
	7 50 5	,,	,,	,,	−0 39·50	−4 15·1	−22·29	−8 55·7	38·77	44·9	,,
	7 51 50	,,	,,	,,	−0 38·95	−4 13·8	−22·78	−9 7·5	38·83	34·4	,,
	7 54 51	,,	,,	,,	+0 11·22	+4 56·3	−23·62	−9 27·6	38·67	38·2	c
	7 55 44	,,	,,	,,	+0 11·63	+5 9·5	−23·86	−9 33·5	38·84	45·5	,,
	7 56 32	,,	,,	,,	+0 11·33	+5 5·1	−24·08	−9 38·9	38·32	35·7	,,
31	7 18 14	L.	G. E.	Position angle Micrometer	+0 0·81	+0 53·4	−13·43	−5 22·6	17 7 38·45	59 12 40·3	,,

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The observations and photographs on November 1 and 3, and the observations on November 4 have been reduced in a similar manner to a common epoch, viz.—7^h 30^m on November 1, 7^h 0^m on November 3, and 6^h 40^m on November 4. The observations in this table have all been corrected for parallax, and the following little table gives the assumed values of log. Δ, and of the motion in each co-ordinate :—

Date.		Log. Δ.	Motion in R.A. in 48^m.	Motion in N.P.D. in 48^m.
			s	″
Nov.	1	9·8479	+11·98	+307·4
	3	9·8720	+ 9·80	+279·6
	4	9·8846	+ 8·82	+263·9

1898.	Greenwich Mean Solar Time.	Obser-ver.	Instru-ment.	Method of Observation.	☄′−✱R.A. Corrected for Refraction and Parallax.	☄−✱N.P.D. Corrected for Refraction and Parallax.	Correction for Motion in R.A.	Correction for Motion in N.P.D.	Apparent R.A. of ☄ Reduced to 7^h 30^m.	Apparent N.P.D. of ☄ Reduced to 7^h 30^m.	Comp. Star.
	d h m s				m s	′ ″	s	′ ″	h m s	° ′ ″	
Nov.	1 6 44 14	G. B.	S. E.	Cross-bar Micrometer	−1 21·16	+0 17·8	+11·42	+4 53·1	17 14 13·68	61 57 14·5	*f*
	6 46 23	,,		,,	−1 20·46	−0 9·6	+10·88	+4 39·3	13·84	56 33·3	,,
	6 48 33	,,		,,	−1 20·30	+0 1·5	+10·35	+4 25·5	13·47	30·6	,,
	6 50 43	,,		,,	−1 19·97	+0 16·6	+ 9·81	+4 11·6	13·26	31·8	,,
	6 52 52	,,		,,	−1 18·60	+0 40·8	+ 9·27	+3 57·9	14·09	42·3	,,
	6 55 0	,,		,,	−1 18·98	+0 50·0	+ 8·74	+3 44·1	13·18	37·7	,,
					☄ Apparent R.A. Corrected for Refraction and Parallax.	☄ Apparent N.P.D. Corrected for Refraction and Parallax.					
					h m s	° ′ ″					
	7 55 2		30-inch	Photograph	17 14 21·81	61 59 6·4	− 6·25	−2 40·3	17 14 15·56	61 56 26·1	
	8 42 8		,,	,,	17 14 33·56	62 4 11·6	−18·00	−7 41·9	15·56	29·7	

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1898.	Greenwich Mean Solar Time	Obser-ver.	Instru-ment.	Method of Observation.	☄ − ✱ R.A. Corrected for Refraction and Parallax.	☄ − ✱ N.P.D. Corrected for Refraction and Parallax.	Correction for Motion in R.A.	Correction for Motion in N.P.D.	Apparent R.A. of ☄ Reduced to 7h 0m	Apparent N.P.D. of ☄ Reduced to 7h 0m	Comp. Star.
	d h m s				m s	′ ″	s	′ ″	h m s	° ′ ″	
Nov.	3 6 46 2	A. C.	S. E.	Cross-bar Micrometer	+0 2·15	+4 18·6	+ 2·85	+1 21·4	17 24 58·25	66 46 51·0	*g*
	6 46 2	,,	,,	,,	−1 58·64	−2 10·2	+ 2·85	+1 21·4	58·74	56·3	*h*
	3 6 55 27	H. F.	,,	,,	+0 3·20	+5 10·8	+ 0·93	+0 26·5	57·38	46 48·3	*g*
	7 3 58	,,	,,	,,	+0 5·80	+5 46·9	− 0·81	−0 23·1	58·24	34 8	,,
	7 7 49	,,	,,	,,	+0 6·12	+6 44·8	− 1·60	−0 45·6	57·77	47 10·2	,,
	7 11 35	,,	,,	,,	+0 7·12	+7 3·4	− 2·36	−1 7·5	58·01	5·9	,,
	7 15 29	,,	,,	,,	+0 7·66	+7 27·2	− 3·16	−1 30·2	57·75	8 0	,,
	6 55 27	,,	,,	,,	−1 56·25	−1 8·1	+ 0·93	+0 26·5	59·21	3·5	*h*
	7 3 58	,,	,,	,,	−1 55·47	−0 32·0	− 0·81	−0 23·1	58·25	46 50·0	,,
	7 7 49	,,	,,	,,	−1 55·07	−0 7·8	− 1·60	−0 45·6	57·86	51·7	,,
	7 11 35	,,	,,	,,	−1 54·63	+0 29·4	− 2·36	−1 7·5	57·54	47 7·0	,,
	7 15 29	,,	,,	,,	−1 53·60	+0 40·1	− 3·16	−1 30·2	57·77	46 55·0	,,
					☄ Apparent R.A. Corrected for Refraction and Parallax.	☄ Apparent N.P.D. Corrected for Refraction and Parallax.					
					h m s	° ′ ″					
	3 7 33 50		30 inch	Photograph	17 25 5·74	66 50 6·2	− 6·91	−3 17·1	17 24 58·83	66 46 49·1	
	7 46 23		,,	,,	17 25 8·31	66 51 19·9	− 9·47	−4 30·2	58·84	49·7	

	Greenwich Mean Solar Time.	Obser-ver.	Instru-ment	Method of Observation.	☄ − ★ R.A. Corrected for Refraction and Parallax.	☄ − ★ N.P.D. Corrected for Refraction and Parallax.	Correction for Motion in R.A.	Correction for Motion in N.P.D.	Apparent R.A. of ☄ Reduced to $6^h 40^m$.	Apparent N.P.D. of ☄ Reduced to $6^h 40^m$.	Comp. Star.
1898.	d h m s				m s	′ ″	s	′ ″	h m s	° ′ ″	
Nov.	4 5 41 17	H. F.	S. E.	Cross-bar Micrometer	−2 17·86	−0 19·5	+10·79	+5 22·8	17 29 32·87	69 1 17·9	*i*
	6 32 3	,,	,,	,,	−2 8·80	+4 9·6	+ 1·46	+0 43·8	32·60	8·0	,,
	4 6 36 56	G. B.	,,	,,	−2 11·09	+4 39·3	+ 0·56	+0 16·8	29·41	10·7	,,
	6 41 3	,,	,,	,,	−2 9·83	+4 51·2	− 0·19	−0 5·8	29·92	0·0	,,
	6 44 10	,,	,,	,,	−2 5·69	+4 39·7	− 0·77	−0 22·9	33·48	0 31·4	,,
	4 7 4 21	A. C.	,,	,,	−2 3·18	+7 16·0	− 4·48	−2 13·9	17 29 32·28	69 1 16·7	,,

Royal Observatory, Greenwich:
1898 *November* 11.

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Approximate Ephemeris of the part of the Leonid swarm through which the Earth passed in 1866. By G. Johnstone Stoney, D.Sc., F.R.S.

In view of the great value which will attach to observations of the *Leonid* stream in the open sky if they can be secured, and taking into consideration that the conditions will be more favourable in the coming season than they have been hitherto, Dr. Isaac Roberts, undeterred by the negative results which have been encountered in former seasons, has expressed his intention of making another attempt to photograph this excessively faint object by careful and prolonged exposure. To enable him and other astronomers to make this attempt, the following Ephemeris has been prepared of that portion of the meteoric stream through which the Earth passed in 1866.

The actual perturbations which have since 1866 affected that portion of the stream have been, during the last few months, computed, assuming Adams's orbit, under the direction of Dr. Downing, F.R.S., superintendent of the *Nautical Almanac* ; and the application to Adams's orbit of the actual perturbations instead of only the average shift of the node, which was all that was known before, has made it possible to render this Ephemeris much more reliable than those which preceded it. This improvement is of importance, since the perturbations during the current revolution—that is, since 1866 November 13—have been abnormally large.

If the stream can be photographed, it will probably impress itself as a very faint and somewhat broad band crossing the field of view, presenting somewhat the appearance of the fainter portion of a comet's tail ; and it is perhaps not quite impossible that the stream, now that it is approaching both the Sun and the Earth, and now that the place to look for it is more exactly known, might be seen with an opera glass by observers where the atmosphere is unusually clear. If seen at all, it would appear to them as an excessively faint and narrow thread of light.

The computations have been made by Mr. Wright, of the *Nautical Almanac* Office, and the cost of preparing the Ephemeris has, as on former occasions, been met by a grant from the Royal Society.

Approximate Ephemeris of the Leonids.

Greenwich Midnight.	Right Ascension.	Decl.	Log. of Dist. from Earth.	Greenwich Midnight.	Right Ascension.	Decl.	Log. of Dist. from Earth.
1899.	h m s	° ′		1899.	h m s	° ′	
Jan. 1	13 43 59	N 0 59	0·6807	Jan. 6	13 44 22	N 1 14	0·6687
2	13 44 5	1 2	0·6784	7	13 44 25	1 18	0·6663
3	13 44 10	1 5	0·6760	8	13 44 27	1 21	0·6638
4	13 44 14	1 8	0·6736	9	13 44 28	1 25	0·6613
5	13 44 18	1 11	0·6712	10	13 44 29	1 28	0·6587